

REMARKS

Status of Application

Claims 1-21 were pending in the application. By this amendment, new claims 22-29 are added. Thus, the status of the claims is as follows:

Claims 2-4, 10, and 13-21 are withdrawn from consideration.

Claims 1, 11, and 12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Application Publication No. US-2002/0030773 A1 to Endo et al. (“Endo”), of record, in view of U.S. Patent No. 5,046,793 to Hockley et al. (“Hockley”) and U.S. Patent No. 5,418,631 to Tedesco (“Tedesco”), of record.

Claims 5 and 6 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Endo in view of Hockley and Tedesco as applied to claim 1 above, and further in view of International Application Publication No. WO 00/08519 A2 to Khazova et al. (“Khazova”), of record.

Claims 7-9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Endo in view of Hockley and Tedesco as applied to claim 1 above, and further in view of U.S. Patent No. 5,999,281 to Abbott et al. (“Abbott”), of record.

The indication, in the Office Action, that the Examiner has no objections to the replacement drawings received on April 14, 2006, is noted with appreciation.

Claim Amendments

Claim 1 has been amended to more specifically define the optical path. Support for this amendment is found in paragraph [0014] and Fig. 1. Thus, this change does not introduce any new matter.

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Claim 9 has been amended to more accurately define the relevant directions. Support for this amendment is found in paragraphs [0041] and [0043] and Fig. 8b. This change is not necessitated by the prior art, is unrelated to the patentability of the invention over the prior art, and does not introduce any new matter.

New Claims

By this amendment, new claims 22-29 are added. Support for claim 22 is found in paragraph [0014] and Fig. 1. Support for claim 23 is found in paragraph [0027] and Fig. 4. Support for claim 24 is found in paragraph [0031] and Fig. 6. Support for claims 25 and 26 is found in paragraph [0041] and Fig. 8b. Support for claim 27 is found in paragraphs [0041] and [0043] and Fig. 8b. Support for claims 28 and 29 is found in paragraph [0014]. Thus, these new claims do not introduce any new matter.

Information Disclosure Statement

An Information Disclosure Statement is being filed concurrently herewith.

35 U.S.C. § 103(a) Rejections

The rejection of claims 1, 11, and 12 under 35 U.S.C. § 103(a), as being unpatentable over Endo, in view of Hockley and Tedesco, is respectfully traversed based on the following.

Claim 1 recites:

1. An image display apparatus comprising:
 - a light source section for supplying an illumination light;
 - a display element for modulating a given illumination light into an image light showing an image;
 - a reflection type hologram for diffracting and reflecting the illumination light from the light source section so as to guide the illumination light to the display element, the reflection type hologram having diffusing properties; and

an eyepiece optical system for guiding the image light from the display element to an eye of a viewer so as to provide an enlarged virtual image of the image,

wherein all illumination light entering the display element has been reflected by the reflection type hologram, and

wherein the image light enters the eyepiece optical system without transmission through the reflection type hologram.

As can be seen, claim 1 requires that all illumination light that enters the display element has been reflected by the reflection type hologram, and that upon leaving the display element, the image light enters the eyepiece optical system without transmission through the reflection type hologram.

In contrast, these limitations with respect to the illumination light and the image light are not disclosed or suggested by the combination of Endo, Hockley, and Tedesco. As noted in the Office Action, Endo does not disclose a reflection type hologram having the required properties, in particular, that it has diffusing properties. Because Endo does not disclose a reflection type hologram having the required properties, it cannot disclose that all illumination light entering the display element has been reflected by such a reflection type hologram. The Office Action cites to Hockley as disclosing a holographic diffuser. The Office Action then asserts that by replacing the transmission type diffuser element of Endo with Hockley's holographic diffuser would be an obvious method to improve brightness uniformity, overall brightness, and reduce chromatic errors. However, the Office Action admits that even this combination does not result in the reflection type holographic diffuser of claim 1. To this end, the Office Action creates the combination of Endo, Hockley, and Tedesco, however, even this combination fails to disclose or suggest each limitation of claim 1.

The Office Action asserts that Tedesco discloses a reflective type hologram having diffusing properties that would diffract and reflect illumination light. However, it would be obvious to one of ordinary skill in the art that replacing the diffuser plate 2 in Endo, with Tedesco's disclosed reflective type holographic diffuser would result in an inoperable device. By replacing the transmissive diffuser plate 2 of Endo with a reflective type

holographic diffuser, no light would reach the display element, as it would all be reflected back to the LED 1 (light source section).

The Office Action's proposed series of substitutions may be likened to the following: Endo's diffuser plate corresponds to a frosted office window designed to diffuse light into an office. Because parts of the office are brighter than others, the frosted window is replaced with a different type of frosted window that, as the Office Action states, provides "improved brightness uniformity." This corresponds to replacing Endo's diffuser plate with Hockley's holographic diffuser plate, as suggested by the Office Action. The next substitution, according to the Office Action, is to replace this improved frosted window with a frosted mirror, i.e., replace Hockley's transmissive type holographic diffuser plate with Tedesco's reflective type holographic diffuser plate. While replacing the original frosted office window (and its resultant non-uniformly lit office) may solve the problem of non-uniform light, the solution of a frosted mirror (and its resultant no light office) is unacceptable. Thus, while each individual replacement may or may not be justified, in the present case, the overall series of substitutions leads to a completely unacceptable result.

The Office Action notes that by substituting the reflective type holographic diffuser for the transmissive diffuser, it would allow for repositioning the light source. However, the Office Action provides no support as to why one of ordinary skill in the art would want to reposition the light source. Turning again to the frosted window/mirror analogy, one would not expect the office worker to move the sun merely to use the substituted frosted mirror. If the office worker is set on using the frosted mirror, perhaps he would tilt the frosted window open, in which case light reflecting off the frosted mirror would again enter the office. This might suggest that using Tedesco's reflective type holographic diffuser plate would merely require changing the angle of Endo's diffuser plate. Such a change in angle would have a drastic impact on the overall design of an image display apparatus. One of ordinary skill in the art would have a difficult time justifying taking a working system and completely redesigning the optical train just to use

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a reflective element instead of a transmissive element. In other words, one of ordinary skill in the art would not be motivated to replace Endo's transmissive type diffuser plate with Tedesco's reflective type holographic diffuser plate.

The Office Action also asserts that by substituting the reflective type holographic diffuser for the transmissive diffuser, the optical system would be compact. However, the Office Action provides no support as to how the optical system would be more compact than that disclosed in Endo. As compactness is important for an image display apparatus, if the suggested system is not more compact than that disclosed in Endo, one of ordinary skill would not make such a substitution.

In sum, the Office Action has failed to establish a *prima facie* case of obviousness from the combination of Endo, Hockley, and Tedesco with respect to each element of claim 1.

Accordingly, it is respectfully requested that the rejection of claims 1, 11, and 12 under 35 U.S.C. § 103(a) as being unpatentable over Endo, in view of Hockley and Tedesco, be reconsidered and withdrawn.

The rejection of claims 5 and 6 under 35 U.S.C. § 103(a), as being unpatentable over Endo in view of Hockley and Tedesco as applied to claim 1 above, and further in view of Khazova, is respectfully traversed based on the following.

Claims 5 and 6 depend from claim 1. As discussed above, the combination of Endo, Hockley, and Tedesco fails to disclose or suggest each limitation of claim 1 and therefore fails to render claim 1 obvious. The combination of Endo, Hockley, Tedesco, and Khazova similarly fails to disclose or suggest each limitation of claim 1. Khazova, like the previously cited references, fails to disclose, suggest, or justify replacing Endo's diffusing plate with a reflection type hologram having the properties specified by claim 1. Therefore, because the combination of Endo, Hockley, Tedesco, and Khazova fails to disclose or suggest each limitation of claim 1, the combination cannot render claim 1

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obvious. Because claims 5 and 6 depend from nonobvious claim 1, claims 5 and 6 are nonobvious for at least the same reasons.

Furthermore, with respect to claim 5, Khazova fails to disclose a “reflection type hologram [that] has a positive optical power and changes the illumination light into a substantially parallel light.” First, Khazova fails to disclose that the reflection type hologram has positive power, indeed, a careful review of the cited portion of Khazova fails to reveal what, if any, optical power the reflection type hologram has. Second, the substantially parallel light is directed to the viewing zone. Light in the viewing zone would be image light, not illumination light as required by claim 5. Thus, claim 5 is nonobvious over the combination of Endo, Hockley, Tedesco, and Khazova for at least these additional reasons.

With respect to claim 6, Khazova fails to disclose, “the display element is disposed on an optical path of the first-order diffracted reflection light of the illumination light diffracted and reflected by the reflection type hologram and a downstream side of position where the zero-order diffracted reflection light is substantially separated from the first-order diffracted reflection light.” More particularly, Khazova fails to disclose that the display element is disposed at a position in which the zero-order diffracted light is substantially separated from the first-order diffracted light. Because Khazova’s display element 62 is located directly on the reflection type hologram 61’, the zero-order and first-order diffracted light cannot be “substantially separated.” That Khazova’s display element is disposed at a location at which the zero-order and the first-order diffracted light are not substantially separated is obvious in Fig. 19. Thus, claim 6 is nonobvious over the combination of Endo, Hockley, Tedesco, and Khazova for at least this additional reason.

Accordingly, it is respectfully requested that the rejection of claims 5 and 6 under 35 U.S.C. § 103(a) as being unpatentable over Endo in view of Hockley and Tedesco as applied to claim 1 above, and further in view of Khazova, be reconsidered and withdrawn.

The rejection of claims 7-9 under 35 U.S.C. § 103(a), as being unpatentable over Endo in view of Hockley and Tedesco as applied to claim 1 above, and further in view of Abbott, is respectfully traversed based on the following.

Claims 7-9 depend, either directly or indirectly, from claim 1. As discussed above, the combination of Endo, Hockley, and Tedesco fails to disclose or suggest each limitation of claim 1 and therefore fails to render claim 1 obvious. The combination of Endo, Hockley, Tedesco, and Abbott similarly fails to disclose or suggest each limitation of claim 1. Abbott, like the previously cited references, fails to disclose, suggest, or justify replacing Endo's diffusing plate with a reflection type hologram having the properties specified by claim 1. Therefore, because the combination of Endo, Hockley, Tedesco, and Abbott fails to disclose or suggest each limitation of claim 1, the combination cannot render claim 1 obvious. Because claims 7-9 depend from nonobvious claim 1, claims 7-9 are nonobvious for at least the same reasons.

Furthermore, with respect to claim 7, Abbott does not disclose a "reflection type hologram [that] has a diffusing anisotropy, and makes a diffusing angle of the diffracted and reflected illumination light different in two directions which are cross perpendicular to each other." The Office Action states, "[f]urther, the diffusion angle of the reflection type hologram in the horizontal direction (X direction as shown in Figure 7) with respect to the viewer may be made larger than that in the vertical direction (Y direction as shown in Figure 7) (See 115 in Figures 3,7)." However, both Figures 3 and 7 show a transmissive diffuser, not a reflection type hologram as required by claim 7. Thus, claim 7 is nonobvious for at least this additional reason. As claims 8 and 9 depend from claim 7, they are likewise considered nonobvious over the combination of Endo, Hockley, Tedesco, and Abbott for at least this additional reason.

Accordingly, it is respectfully requested that the rejection of claims 7-9 under 35 U.S.C. § 103(a) as being unpatentable over Endo in view of Hockley and Tedesco as applied to claim 1 above, and further in view of Abbott, be reconsidered and withdrawn.

CONCLUSION

Wherefore, in view of the foregoing amendments and remarks, this application is considered to be in condition for allowance, and an early reconsideration and a Notice of Allowance are earnestly solicited.

This Amendment increases the number of independent claims by 1 from 2 to 3 and increases the total number of claims by eight from 21 to 29, but does not present any multiple dependency claims. Accordingly, a Response Transmittal and Fee Authorization form authorizing the amount of \$400 to be charged to Sidley Austin LLP Deposit Account No. 18-1260 is enclosed herewith in duplicate. However, if the Response Transmittal and Fee Authorization form is missing, insufficient, or otherwise inadequate, or if a fee, other than the issue fee, is required during the pendency of this application, please charge such fee to Sidley Austin LLP Deposit Account No. 18-1260.

If an extension of time is required to enable this document to be timely filed and there is no separate Petition for Extension of Time filed herewith, this document is to be construed as also constituting a Petition for Extension of Time Under 37 C.F.R. § 1.136(a) for a period of time sufficient to enable this document to be timely filed.

Any other fee required for such Petition for Extension of Time and any other fee required by this document pursuant to 37 C.F.R. §§ 1.16 and 1.17, other than the issue fee,

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and not submitted herewith should be charged to Sidley Austin LLP Deposit Account No. 18-1260. Any refund should be credited to the same account.

Respectfully submitted,

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